

# **A Study for the Factors Affecting E-learning Cognition and Intention: Using a Case Institute of Technology as an Example**

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*Abstract:* -During the new Knowledge Economy, the rising and flourishing of the Internet promote e-learning successfully and make it become a significant and flexible learning environment. In this kind of distance learning, the students can not only search different resources on the Internet without the limit of times and spaces but also complete the learning activities. This is a study using Mei Ho Institute of Technology in Taiwan as an example. The research mainly deals with varieties of evaluation of e-learners. The participants are either from night school division or weekend school division in the case institute of technology. The researchers collected data from questionnaire. Furthermore, according to collected data, the researchers discuss the effects of variables, learners' perceived ease of use, and intention to use by using Factor Analysis and Stepwise Regression.

. The study proves the learning intention that influences the teachers and the students to use the systems of e-learning by TAM. According to the study, to promote the learning intention, a good e-learning environment can not only fulfill the basic requirements of the teachers and the students, but also provide the classrooms with enough Internet equipments and suitable online learning texts. Therefore, the research suggests instructors to give learners instant feedbacks, to encourage students to try e-learning, and timely to inform students of their learning progress. , At the same time, teachers should place special emphasis on the enhancements of learners' self-efficacy on the Internet and of the interaction between teachers and students in activities. As a result, the features of e-learning and its goal can be maximized.

*Key-Words:* - Technology Acceptance Model (TAM), E-learning, Cognition, Intention.

## **1 Introduction**

During the new Knowledge Economy, the rising and flourishing of the Internet successfully promote the Web-based learning and make it become a significant and flexible learning environment. The uses of the internet are integrated into 2/3 of the learning activities

of the e-learning courses in Mei--Ho Institute of Technology (the case institute). It requires the students to participate the activities on their own initiatives to bring up their own pace to learn. Also, the e-learning system would record complete learning comportment of the students to press both the teachers and the students.

As a result, the students could build up a self-learning system through e-learning.

This study requires the e-learning system and the courses offered by the case Institute in order to probe e-learning. By TAM, this study is to prove the learning effects of the teachers' and the students' in using the systems of e-learning. The sample of this study is the class students participated in the e-learning ,and the external or independent variable are: (1) contents (2) study guidance (3) design of teaching activities (4) instructional media of the e-learning texts. And the intervening variable is the correlation between "perceived usefulness" and "perceived ease of use." . Finally, the researchers probe the dependent variables (intention to use) through the intervening variable as a reference for the related institutes or schools to carry out the e-learning afterwards.

## 2 Literature Review

Davis addressed the TAM (Technology Acceptance Model) in 1989 [5]. It is suitable for explaining the effects caused by the attitude and behavioral intention of the users of the computer. It connects the usefulness, ease of use, the attitude of the users and the intention of the users with the actual computer using behavior. The TAM presumes that the perceived usefulness and perceived ease of use would affect the behavioral intention by the attitude of the users. Davis addressed the TAM (Technology Acceptance Model) in 1989[5]; the TAM mainly probes the relationship between the perceived usefulness (U), the perceived ease of use (EOU) and the behavior intention (BI) of the information system and the users. Also, Davis proved that the intention of the people who use computer can be validly predicted, and the usefulness and the ease of use are the main factors that affect the intention of people who use computers.

New e-learning mode is more flexible for the students in the choice of time, space and study pace [9]. Si--Wei Zhou [7] also pointed out that the learners think Internet tech is helpful to them not only in managing the learning hours and places more flexible but also in arranging the learning progress according to the abilities of oneself . E-learning and mobile learning offer methods, which decrease the limitations of traditional education. [8].However, Burns [4] et al. in 1990 think the text that dialogue with the learners would influence the learners to a certain degree directly. Thus, this study presumes that the contents, study guide, design of teaching activities and instructional media of the e-learning texts are the factors that affect e-learning.

## 3. Research Design

### 3.1 Research framework

According to literature review, TAM mainly probes the users' acceptance model to the information system. This is a study using Mei Ho Institute of Technology in Ping-Tung Taiwan as a case example. As a result, the survey of the proposed e-learning was conducted in the class of the case institute mentioned above.

This study adopted the TAM theory, defining "e-learning" as "technology" which mentioned in the TAM theory. Based on the TAM mode, the development of the questionnaire mainly referred to the essay of Moon and Kim [6]. The research framework of this study is as follows: Fig.1

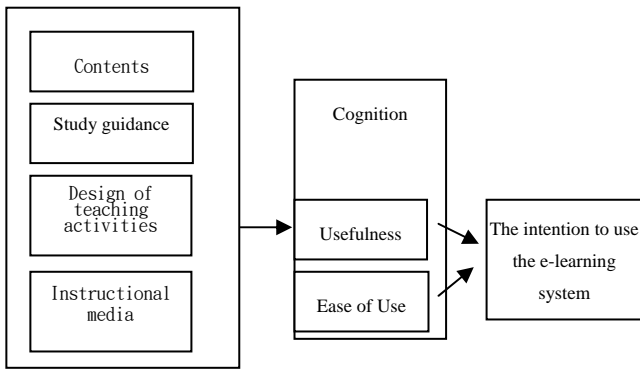


Fig.1 The frame of research

### 3.2 Methodology

In this study, the external variables are the contents, learning guidance, design of teaching activities and instructional media of the e-learning texts. The intervening variables are perceived usefulness and perceived ease of use.

The variables mentioned above are measured by the Likert-type scale, five options are provided: 5 means "strongly agree", 4 means "agree", 3 means "undecided", 2 means "disagree" and 1 means "strongly disagree".

## 4. Results and Discussion

### 4.1 Data analysis of the sample

2/3 of e-learning program provided by the case Institute is conducted by Internet. Those who are taking e-learning program are either from night school division or weekend school division in the case Institute. Due to the constraint of time and cost, the participants in this study are those who are taking distance courses in the semester of 2006.calendar year. Also, the researchers used the system of e-learning platform that the case Institute offered. The researchers received 500 written questionnaires and 473 on-line ones in total. The findings show:

- 93% of the learners think e-learning makes their time more flexible and enables them to adjust their learning progress every week.
- 91% think they can adjust the difficulties of

e-learning content in light of their learning situation.

- 95% agree e-learning saves them a lot of time, so they can make use of their time better and review when free. They no longer worry they may fall behind schedule due to absence.
- 90% think the experience of e-learning can affect their own learning effects.
- 90% think in comparison with traditional instruction, they can learn more effectively via e-learning.
- Approximately 92% express e-learning can double learning results. For example, students can go through some lessons, which they are not sure, over and over again via e-learning.

### 4.2 Instrument, and its validity and reliability

The questionnaires in this study are composed of 2 parts. The first part is personal data (containing experience related to e-learning). The second part deals with investigation of respondents' opinions.

In order to establish construct validity, factor analysis was conducted. The software of SPSS was used, and principal components analysis and least oblique method were employed as well. Among them, the variable of intention to use was considered one factor; perceived ease of use and the use of a computer were regarded as one factor based on factor analysis; the content of teaching materials and the design of teaching materials were considered one factor「teaching material」 based on factor analysis. Therefore, the second part of this questionnaire contains 8 factors, content, learning guidance, the design of teaching, instructional media, intention to use, perceived usefulness, perceived ease of use, and experience of using a computer.

The researchers set up validity of the second part of this questionnaire by using of Cronbach  $\alpha$  Coefficient. Every  $\alpha$  Coefficient value in all of the factors is above

0.7, except for 「learning guidance」whose  $\alpha$  Coefficient value is lower (0.6333) in comparison. Therefore, all the reliabilities reached to the acceptable level.

### 4.3. Hypotheses

According to the results of factor analysis, the researchers discuss intermediary variable (the relationship between usefulness and perceived ease of use by regarding exterior variable (content, learning guidance, the design of teaching, and instructional media of e-learning) as independent variable. Then, the researchers discuss the relationship of dependent variable (intention of use) by using usefulness and perceived ease of use as independent variable (See Table 1).

Table 1 Hypotheses

1. : The effects of external variables and perceived ease of use on learners' perceived usefulness	HB1: The variety of the content of teaching materials can significantly affect Perceived ease of use in a positive way.
HA1 The diversity of the content of teaching materials can significantly affect perceived usefulness in a positive way.	HB2: The design of teaching can significantly affect perceived ease of use in a positive way.
HA2: The design of teaching can significantly affect perceived usefulness in a positive way	HB3: Learning guidance can significantly affect perceived ease of use in a positive way.
HA3: Learning guidance can significantly affect perceived usefulness in a positive way	HB4: richness of instructional media can significantly affect perceived ease of use in a positive way.
HA4: Instructional media can significantly affect perceived usefulness in a positive way	HB5-1: The experience of using a computer can significantly affect perceived ease of use in a positive way.
HA5-1: The experience of using a computer can significantly affect perceived usefulness in a positive way	HB5-2: The experience of the use of the Internet can significantly affect perceived ease of use in a positive way.
HA5-2:The use of the Internet can significantly affect perceived usefulness in a positive way	HB5-3: The experience of e-learning can significantly affect perceived ease of use in a positive way.
HA5-3: The experience of e-learning can significantly affect perceived usefulness in a positive way	HB6: Cognition (Sensation/intuition) can significantly affect perceived ease of use.
HA6: Cognition(Sensation/intuition) can significantly affect perceived usefulness	3. : The effects of external variables, perceived usefulness and perceived ease of use on intention to use
HA7: Perceived ease of use can significantly affect perceived usefulness in a positive way	HC1: The richness of the content of teaching materials can significantly affect intention to use in a positive way.
2. : The effects of external variables on learners' perceived ease of use	HC2: The design of teaching can significantly affect intention to use in a positive way.
	HC3: Learning guidance can significantly affect intention to use in a positive way.
	HC4: The richness of instructional media can significantly affect intention to use in a positive way.
	HC5-1: The experience of using a computer can significantly affect intention to use in a positive way.
	HC5-2: The experience of using the Internet can significantly affect intention to use in a positive way.
	HC5-3 The experience of e-learning can significantly affect intention to use in a positive way.
	HC6: Cognition (Sensation/intuition) can significantly affect intention to use.
	HC7: Perceived usefulness can significantly affect intention to use in a positive way...
	HC8: Perceived ease of use can significantly affect intention to use in a positive way...

#### 4.4 Testing and verifying the theory of Technology Acceptance Mode

Stepwise regression was used to test and verify hypotheses using the software of SPSS. The results are as follows:

##### 4.4.1 The impacts of external variables and Perceived ease of use on perceived usefulness

The significance of the stepwise regression formula reached  $P < 0.05$ . The regression coefficients of the variables, which include content of teaching materials, the design of teaching materials, and the experience of using a computer, are all significant. Therefore, HA1, HA2 and HA5-1 are established. According to the regression coefficients, the ranks of explanation power of perceived usefulness are the experience of using a computer first, the content of teaching materials second, and the design of teaching last. Furthermore, these 3 variables can explain 58.3% of the total variation of perceived usefulness.

Durbin-Watson value is 2.168, meaning that the difference is not against our hypotheses. VIF value is 1.000~1.112, meaning that there is no collinear existing among variables [2].

##### 4.4.2 The impacts of external variables on perceived ease of use

The significance of the total regression equation reached  $p < 0.05$ . The regression coefficients of instructional media, the experience of using a computer, and the experience of using the Internet are all significant; therefore, HB4, HB5-1, HB5-2 are established. According to the regression coefficients, the ranks of explanation power of perceived usefulness are the experience of using a computer first, the experience of using the Internet second, and instructional media last. These 3 variables mentioned above explain 38.2% of the

total variation of perceived ease to use. Durbin-Watson value is 2.168, meaning that the difference is not against our hypotheses. VIF value is 1.000~1.112, meaning that there is no collinear existing among variables [2].

##### 4.4.3 The impact of external variables, perceived usefulness, and perceived ease of use on intention to use

The significance of the total regression equation reached  $p < 0.05$ . The regression coefficients of the content of teaching materials, the experience of using a computer, and perceived ease of use are all significant. Therefore, HC1, HC501, and HC8 are established. According to the regression coefficients, the ranks of explanation power of perceived usefulness are the content of teaching materials first, the experience of using a computer second, and perceived usefulness last. These 3 variables mentioned above can explain 65.2% of the total variation of perceived ease to use.

Durbin-Watson value is 2.168, meaning that the difference is not against our hypotheses. VIF value is 1.000~1.112, meaning that there is no collinear existing among variables [2].

## 5. Conclusions and Suggestions

The researchers propose the conclusions and the suggestions for this study as follows:

- The factors which can significantly affect perceived usefulness contain the content of teaching materials, the design of teaching, and the experience of using a computer.
- The factors which can significantly affect perceived ease of use involve instructional media, the experience of using a computer, and the experience of using Internet.
- The factors which can significantly affect intention to use are teaching material, the experience of

using a computer, and perceived ease of use.

The results of this study also show perceived ease of use is the factor that can influence intention to use most, so perceived ease of use does not significantly affect the relationship between perceived usefulness and intention to use in TAM. As Pearson coefficient has been shown, this study show that perceived ease of use appears to affect perceived usefulness and intention to use via other factors after the inter-reaction among variables.

The researchers made use of TAM mode to analyze the related variables of e-learning. Although it is significant, there are still more factors worth discussion in the aspect of technology-based teaching. For example, teachers' perspective of this mode is one of the important factors as well, particularly instructors' instant feedback and their encouraging learners to learn something on the Internet. Specially, the e-learning will become more and more popular with the progress of information and communication technologies. they should inform learners their progress in a certain period of time. In terms of students' current satisfaction of instructors teaching method, e-learning, the findings show that the ratio is over 90%, which is far higher than 3 years ago, approximately 56%. Learners' satisfaction of e-learning has improved to a certain extent. The researchers will still need to keep on enhancing the interestingness and the richness of the content of e-teaching materials of the e-learning platform, such as teaching materials, audios and videos, and elaboration. In addition, for example, the teacher can grab learners' attention and trigger their motivation by rich colors, the motion effects of the pictures, and games. At the same time, the teacher should place special emphasis on enhancements of learners' self-efficacy on the Inherent and of the interaction between teachers and students in activities. By doing so, the teacher can maximize the features of e-learning and achieve his maximum goal.

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